What We Claim Is:

1. A process for the oxidation of p-xylene to terephthalic acid comprising oxidizing in the liquid phase a p-xylene composition comprising at least 80 wt.% p-xylene based on the weight of liquid reactants, at a temperature in the range of 120°C to 250°C and in the presence of a source of molecular oxygen and a catalyst composition substantially free of zirconium atoms comprising a source of nickel (Ni) atoms, a source of manganese (Mn) atoms, and a source of bromine (Br) atoms, to form a crude reaction mixture comprising terephthalic acid and incompletely oxidized reaction products comprising 4-carboxybenzaldehyde (4-CBA) compounds, wherein the stoichiometric molar ratio of bromine atoms to manganese atoms is 1.5 or less, and the amount of nickel atoms is at least 500 ppm.

2. The process of claim 1, wherein said solvent comprises an acetic acid composition.

3. The process of claim 2, wherein said acetic acid composition comprises 2.5 to 15 wt.% water.

4. The process of claim 1, wherein the molar ratio of Br to Ni and the molar ratio of Br to Mn are each 1.5 or less and at least 0.3.

5. The process of claim 4, wherein the molar ratio of Br to Ni and the molar ratio of Br to Mn are each 1.1 or less.

6. The process of claim 5, wherein the molar ratio of Br to Ni and the molar ratio of Br to Mn are each 1.0 or less.

7. The process of claim 6, wherein the molar ratio of Br to Ni is 0.9 or less.

8. The process of claim 1, wherein the molar ratio of nickel atoms to manganese atoms ranges from 0.2:1 to 4:1.

9. The process of claim 8, wherein the molar ratio of nickel atoms to manganese atoms ranges from 0.5:1 to 2.5:1.

10. The process of claim 1, wherein the molar ratio of Br to Mn is 1.1 or less.

11. The process of claim 10, wherein the molar ratio of Br to Mn is 1.0 or less.

12. The process of claim 1, wherein the oxidation temperature is within a range of 140°C to 190°C and the oxidation reaction is conducted under a pressure in the range of 50 to 175 psig.

13. The process of claim 1, wherein the catalyst composition contains less than 2 ppm Zr.

14. The process of claim 1, wherein the catalyst composition contains less than 5 ppm cobalt.

15. The process of claim 15, wherein the reaction mixture comprises 40,000 ppm 4-CBA or less.

16. The process of claim 1, wherein the 4-CBA content in the solids is 10,000 ppm or less.

17. The process of claim 1, wherein the ratio of solvent burn is 0.80 moles COx per mole of terephthalic acid produced.

18. The process of claim 18, wherein said ratio is 0.70 or less.

19. The process of claim 1, wherein the catalyst composition is free of cobalt atoms.

20. The process of claim 1, wherein the ratio of solvent burn is 0.60 moles COx per mole of terephthalic acid or less, and the total quantity of 4-CBA in the solid and liquid phase is 40,000 ppm or less.

21. The process of claim 20, wherein the total quantity of 4-CBA is 10,000 ppm or less.

22. A catalyst composition substantially free of zirconium atoms comprising a source of nickel (Ni) atoms, a source of manganese (Mn) atoms, and a source of bromine (Br) atoms, wherein the stoichiometric molar ratio of bromine atoms to manganese atoms is 1.5 or less, and the amount of nickel atoms is at least 500 ppm.

23. The process of claim 22, wherein the molar ratio of Br to Ni and the molar ratio of Br to Mn are each 1.5 or less and at least 0.3.

24. The process of claim 23, wherein the molar ratio of Br to Ni and the molar ratio of Br to Mn are each 1.0 or less.

25. The process of claim 22, wherein the molar ratio of nickel atoms to manganese atoms ranges from 0.5:1 to 2.5:1.

26. The process of claim 22, wherein the molar ratio of Br to Mn is 1.0 or less.

27. The composition of claim 22, wherein the catalyst composition is represented by the formula: $Ni_{1-2.5}Mn_{1-2}Br_{0.3-1.5}$.

28. The composition of claim 22, wherein the catalyst composition is represented by the formula: $Ni_{1-2.5}Mn_{1-2}Br_{0.6-1}$.